

DETAILED ACTION

Notes

1. Claims 56-59 and 63 were cancelled by amendment prior to the first action.

Election/Restrictions

2. Applicant's reply, dated 7/29/2009, to examiner's election/restriction requirement is noted. Examiner disagreed with applicant's claim listing and proposed an alternative listing, claims 1-5, 20, 21, 41-43, 60-62, 64-68, and 76, to read on the elected species, i.e. "LCD using PWM of a single light source backlight to generate first and second intensity levels", with 1, 61 and 76 generic. Election of the proposed claims was made by Charu Mehta in a telephone interview on 9/16/2009. Examiner failed to raise the issue of traverse in the interview. Acknowledgement of this election and traversal of the election requirement, if desired, must be included in the response to this office action.
3. Claims 6-19, 22-40, 44-55, and 69-75 withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected species, there being no allowable generic or linking claim.

Requirement for Information

4. The documents and answers provided by applicant in response to the requirement for information sent 5/29/2009 are gratefully acknowledged. The submittal fully satisfies the requirement.

Claim Objections

5. **Claim 62** objected to because of the following informalities: The claim contains a typo and thus is missing a lower limit for K. The lower limit, "0", can be found at [0633] of the PG PUB. Appropriate correction is required.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. **Claims 1, 2, 5, 20, 41, 42, 61-62, 64, 67, and 76** rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent Application Publication No. 2002/0008694 to *Miyachi et al.* ("*Miyachi*").

As to claim 1, *Miyachi* discloses a video display device modulating luminances of pixels in accordance with a video signal to display video (see for example Fig. 1),

said device emitting a first light emission component (see for example Fig. 46 emission period "H1") and a second light emission component (see for example Fig. 46 the emission period "P"),

the first light emission component accounting for D % of a vertical cycle of the video signal in terms of duration and S % of a light emission intensity of a pixel over the vertical cycle (see for example Fig. 46),

the second light emission component accounting for (100-D)% of the vertical cycle in terms of duration and (100-S)% of the light emission intensity (see for example Fig. 46),

wherein an amount of trailing and an amount of flickering are reduced relative to the amounts of trailing and flickering for S=100 by controlling the first light emission component and the second light emission component so that D and S meet either

a set of conditions A: $62 \leq S < 100$, $0 < D < 100$, and $D < S$, (see for example Fig. 46, which shows D roughly = 50 and S roughly = 69) or

a set of conditions B: $48 < S < 62$, and $D \leq (S - 48)/0.23$.

As to claim 2, in addition to the rejection of claim 1, *Miyachi* further discloses:

video display means setting transmittances of pixels in accordance with the video signal (see for example Fig. 1 especially "LIQUID CRYSTAL PANEL"); and a light source body illuminating the video display means,

wherein the light source body controls light emission intensities of the first light emission component and the second light emission component (see for example Fig. 46; note that it is the emission of the CCFL tube that is pictured).

As to claim 5, in addition to the rejection of claim 2, *Miyachi* further discloses that the light source body is a cold cathode fluorescent lamp (see for example Fig. 1 item 3 "COLD CATHODE TUBE").

As to claim 20, in addition to the rejection of claim 1, *Miyachi* further discloses:

scene change detect means detecting an amount of scene change in the video from the video signal (see for example [0351] especially "allows the adjustment of luminance and timing in response to such moving images"; a response to "moving images" is a response to an amount of scene change), wherein

a value of S or D is changed in accordance with the amount of scene change (see for example [0351]; note that a change in luminance, for example, requires that either S or D or both change since the on-state luminance is fixed).

As to claim 41, in addition to the rejection of claim 1, *Miyachi* further discloses that:

the second light emission component is formed by a collection of pulse components having a higher frequency than a vertical frequency of the video signal (see for example Fig. 46 in which the emission period "P" includes a plurality of pulses of length "H2"; 4.5 cycles are shown within 1/2 frame time

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making the frequency of the pulses approximately 9 times the vertical frequency of the video signal in the example).

As to claim 42, in addition to the rejection of claim 41, *Miyachi* further discloses that:

the pulse components have a frequency three times a vertical frequency of the video signal or a higher frequency (ibid. approximately 9x the vertical frequency).

As to claim 61, *Miyachi* discloses a video display device modulating luminances of pixels in accordance with a video signal to display video (see for example Fig. 1),

said device emitting a first light emission component (see for example Fig. 46 emission period "H1") and a second light emission component (see for example Fig. 46 the emission period "P"),

the first light emission component accounting for D % of a vertical cycle of the video signal in terms of duration and S % of a light emission intensity of a pixel over the vertical cycle (see for example Fig. 46),

the second light emission component accounting for (100-D)% of the vertical cycle in terms of duration and (100-S)% of the light emission intensity (see for example Fig. 46),

wherein D and S meet either

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a set of conditions A: $62 \leq S < 100$, $0 < D < 100$, and $D < S$, (see for example Fig. 46, which shows D roughly = 50 and S roughly = 69) or

a set of conditions B: $48 < S < 62$, and $D \leq (S - 48)/0.23$;

an amount of trailing and an amount of flickering for $S=100$ are simultaneously reduced by controlling the first light emission component and the second light emission component so that

$D/2 \leq P \leq 100 - D/2$), and $0 < D < 100$, where P is a ratio in percentages of a duration to the vertical cycle, the duration beginning at a start of the vertical cycle and ending at a midpoint of a light emission period associated with the first light emission component (see for example Fig. 46, which shows D roughly = 50 and P roughly = 75 and the "H1" or D period falling within a frame time).

As to claim 62, in addition to the rejection of claim 61, *Miyachi* further discloses that:

$P = 50 + K$ for $0 \leq K \leq (50 - D/2)$ (see for example Fig. 46, which shows D roughly = 50, K roughly = 25 and P roughly = 75), where K is a constant dictated by a response time constant of the video display means (see for example [0350]-[0351] especially "until the response of the liquid crystal of the pixels therein is substantially complete"; note that changing the ON location changes K). (As noted above, examiner found the lower limit for K , "0", at [0633] of the PGPUB.)

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As to claim 64, in addition to the rejection of claim 61, *Miyachi* further discloses:

video display means setting transmittances of pixels in accordance with the video signal see for example Fig. 1 especially "LIQUID CRYSTAL PANEL"); and

a light source body illuminating the video display means, wherein the light source body controls P (see for example Fig. 46; note that it is the emission of the CCFL tube that is pictured).

As to claim 67, in addition to the rejection of claim 64, *Miyachi* further discloses that the light source body is a cold cathode fluorescent lamp (see for example Fig. 1 item 3 "COLD CATHODE TUBE").

Claim 76 claims the method implicit in the apparatus claimed in claim 1 and is rejected on the same grounds and arguments.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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2. Claims 3, 4, 21, 43, 60, 65, and 66 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application Publication No. 2002/0008694 to *Miyachi et al.* ("*Miyachi*").

As to **claims 3 and 4**, in addition to the rejection of claim 2 over *Miyachi*, LED backlights were known alternatives to CCFL lamps and their use would have been obvious as art recognized backlight options.

As to **claims 21 and 60**, in addition to the rejection of claim 2 over *Miyachi*, *Miyachi* further discloses means detecting insufficient luminance of the light source body and that

a value of S or D is changed in accordance with detection (see for example [0537] especially "when the response time of the liquid crystal is slow, and the luminance of the illuminating elements themselves is not satisfactorily high, the display device can be made brighter by switching ON the illuminating elements after an elapsed time shorter than the 1/2 frame time"; turning ON sooner increases both S and D).

Since multiple LCD pixels are illuminated by each illuminating element, i.e. CCFL tube, it is either disclosed or reasonably suggested that the luminance levels in the video from the video signal for the plurality of illuminated pixels be taken into account for the determination of "not satisfactorily high". As soon as one determines to take multiple items into account at once, statistical methods

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are suggested to one of ordinary skill in the art. Which suggestion leads to a limited number of extremely common ways to take the video signal levels of multiple pixels into account. These are the single value statistics: peak, mean, median, mode – any of which, except peak, could be termed the “average”; and the dual value statistics (mean,range) and (mean,standard-deviation) – both of which can be said to be generated from histograms.

One of ordinary skill in the art could have pursued the known solutions with a reasonable expectation of success since these basic statistical methods and their mutual benefits and drawbacks were known to those skilled in the art.

Therefore (claim 21) it would have been obvious to use the average luminance level in the video from the video signal as a criterion upon which the determination of insufficient luminance of the light source body was made and to provide detecting means therefore and all claimed limitations are met.

Therefore (claim 60) it would have been obvious to use a dual value statistic of the luminance level in the video from the video signal as a criterion upon which the determination of insufficient luminance of the light source body was made and to provide detecting means therefore, that is a histogram detect means, and all claimed limitations are met.

As to **claim 43**, in addition to the rejection of claim 41 over *Miyachi*:

Miyachi does not expressly disclose that the pulse components have a frequency of 150 Hz or higher since Miyachi doesn't expressly disclose a particular frame frequency.

Examiner takes official notice that it was well known to use frame frequencies above 17 Hz (150/9 is 16.66). In particular frame frequencies of 24, 30, 60, and 120 Hz were well known.

It would have been obvious to use a well known frequency as the frame frequency and thus obvious to employ pulse components having a frequency of 150 Hz or higher.

As to **claims 65 and 66**, in addition to the rejection of claim 64 over *Miyachi*, LED backlights were known alternatives to CCFL lamps and their use would have been obvious as art recognized backlight options.

2. Claim 68 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application Publication No. 2002/0008694 to *Miyachi et al.* ("*Miyachi*") in view of U.S. Patent No. 6,980,225 to *Funamoto et al.* ("*Funamoto*").

As to **claim 68**, in addition to the rejection of claim 64 over *Miyachi*, *Miyachi* further discloses that the ON time should not start "until the response of the liquid crystal of the pixels therein is substantially complete" (see for example [0350]-[0351]; note that changing the ON location changes P). This teaching, coupled with the knowledge of one of ordinary skill in the art that the LCD panel

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is traditionally scanned a row at a time and thus that the rows at the top obtain a state in which the response of the liquid crystal of the pixels therein is substantially complete before the rows at the bottom, seems to reasonably suggest the further limitations of claim 68.

However as *Miyachi* does not expressly disclose that “the light source body changes P in value from one area to another, the video display screen being divided into the areas”, art with the explicit teaching is combined for completeness.

Funamoto discloses an image display apparatus and method and in particular that

the light source body changes P in value from one area to another,

the video display screen being divided into the areas (see for example Fig. 9 especially “UPPER PORTION” and “LOWER PORTION” and the difference in position of the “LIGHTING-UP” times; recall that P simply describes the center of the “LIGHTING-UP” time).

Miyachi and *Funamoto* are analogous art because they are from the same field of endeavor, which is liquid crystal displays.

At the time of invention, it would have been obvious to a person of ordinary skill in the art to control the light source body of *Miyachi* such that the light source body changes P in value from one area to another as taught by *Funamoto*.

The suggestion/motivation would have been to provide advantages such as to allow the start of the pulse to coincide with the time when the response of the liquid crystal of the pixels therein is substantially complete or to minimize motion blurring and contour coloring that may occur on part of a screen while improving on motion blurring in a moving image (see for example *Funamoto* 4:10-14).

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. 2002/00673322 to Hirakata et al. is a patent family publication of EP 1 213 699 provided by applicant on 12/19/07 IDS, some pertinent teachings can be found at [0396] freely control times and [0422] 100% and 50% as the intensity of on/off states.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ROBERT R. RAINEY whose telephone number is (571)270-3313. The examiner can normally be reached on Monday through Friday 8:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amare Mengistu can be reached on (571) 272-7674. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/RR/

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